ELECTRICAL & COMPUTER ENGINEERING SEMINAR

"Non-Binary LDPC Communications: Breaking Loose from the Binary Straitjacket"

by

Dr. Amir Bennatan

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March 9, 2009, 11:00 am - 12:00 noon
LSC 203-5

Abstract & Biography

Abstract. LDPC codes generated a breakthrough in wireless communications, enabling dramatic improvements in transmission speeds and computational complexity. Their decoding algorithm is a special instance of iterative belief-propagation, whose diverse applications include bioinformatics and speech recognition. While binary LDPC codes are well understood, wireless communication requires greater bandwidth efficiency than possible with binary codes. Prior to our work, interest in *non*-binary LDPC codes was sparse, due to what appeared to be their insusceptibility to analysis.

In this talk, I will give a brief overview of the state-of-the-art in LDPC analysis, and present simple techniques that can be used to substantially simplify the analysis of non-binary codes. Using this analysis, we succeeded in optimizing codes to support transmission at data rates that are remarkably close to theoretical limits.

The talk is intended for a wide audience, and no prior knowledge of LDPC codes will be assumed.

Joint work with David Burshtein (Tel Aviv University)

Biography. Amir Bennatan received the B.Sc. degree (*/summa cum laude/*) in mathematics and computer science, from Tel Aviv University in 1994. He received the M.Sc. degree (*/magna cum laude/*) and the Ph.D. degree, both in electrical engineering, from Tel Aviv University, in 2002 and 2006 respectively.

During 1995-2000 he worked at the Israel Air Force Information Systems unit, including three years as a software team leader and systems analyst. He is currently a post-doctoral researcher at the Program for Applied and Computation Mathematics (PACM) at Princeton University.

Dr. Bennatan was a recipient of a scholarship from the Wolf Foundation in 2002, of the Weinstein award in 2002, 2003 and 2004 and of an Intel study award in 2004. His fields of interest include wireless networks and software engineering methodologies.

Please contact Prof. Ali Pezeshki, pezeshki@engr.colostate.edu, with any questions.